



0329.68516

## PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re U.S. Patent Application )

Applicant: Schade et al. )

Serial No.: 10/687,501 )

Conf. No. 9042 )

Filed: October 16, 2003 )

For: ECONOMY INK JET PRODUCT )  
AND COATING COMPOSITION )

Art Unit: 1774 )

Examiner: Schwartz, Pamela R )

I hereby certify that this paper is being deposited with  
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10/07/05  
Date

*Carrie A. McElroy*  
Registration No. 30,778  
Attorney for Applicants

DECLARATION OF LEONARD SCHLIESMAN

I, Leonard Schliesman, declare as follows:

1. I reside at 1310 16<sup>th</sup> St., N., Wisconsin Rapids, Wisconsin.
2. I hold a Bachelor's Degree in Chemistry from South Dakota State University, a Master's Degree in Paper Technology from the Institute of Paper Science and Technology and a Masters Degree in Business Administration from the University of Wisconsin at Oshkosh.
3. I have been employed by Stora Enzo North America, or its predecessor, Consolidated Paper Company, for more than 39 years in research and development of papers and related products.

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4. My current assignment includes development of coatings on papers for ink jet printers.

5. I am a co-inventor with Robert Schade on U.S. Patent No. 6,808,767. This patent discloses and claims a method of making the recording medium that is the subject of the subject application.

6. Cooking of the boric acid and a polyvinyl alcohol solution is the only method of forming a solution of these components. The boric acid will not go into solution by simply adding it to cooked polyvinyl alcohol.

7. Creation of a boric acid-polyvinyl alcohol solution leads to formation of hydrogen (or physical) bonds form between the polyvinyl alcohol and boric acid groups, developing an open structure that acts as a sieve. Carrier fluids of ink jet inks can readily penetrate the coating layer through openings in the sieve, while solid ink particles are trapped by the sieve.

8. I am also a co-inventor of U.S. Patent Application No. 10/687,501, filed October 16, 2003. This patent is directed to a recording medium made by the process of U.S. Patent No. 6,808,767.

9. Formation of the sieve-like structure of this coating results from cooking of the polyvinyl alcohol-boric acid solution as taught in U.S. Patent No.

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6,808,767. The resulting coating allows penetration of the coating by the ink carrier and allows it to pass through the coating to the base sheet.

10. Since the ink carrier easily passes through the polyvinyl alcohol/boric acid coating and is absorbed by the base sheet itself, the coating can be made without the addition of porous filler materials.

11. I have read U.S. Patent 4,877,686 to Riou ("Riou"). This reference teaches that polyvinyl alcohol and boric acid chemically combine to form a gel. Gelled coatings have viscosities in excess of 20,000 cps and are difficult to apply in a thin layer on the surface of a base sheet. The gel itself is a barrier to solvents such as the ink carrier, preventing passage of the carrier through the coating to the base sheet surface.

12. Chemical reactions that harden, cross-link or coagulate the polyvinyl alcohol-boric acid mixture are not initiated by the cooking process, resulting in a different coating structure than the prior art coatings. The viscosity of the cooked boric acid-polyvinyl alcohol mixture is essentially the same as the polyvinyl alcohol cooked without boric acid, that is, about 1000 cps at 20% solids and 90°F. The coating remains at about 1000 cps for at least several days until it is applied to the base sheet.

13. Since the ink carrier cannot pass through the coating to the base sheet, porous pigments or fillers, such as fumed silica, are required for absorption of the ink carrier. In this case, the carrier is absorbed into the coating, not the base sheet.

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Significantly thicker coatings are required to absorb the carrier. This is evidenced by the coating weight of over 200 g/m<sup>2</sup> in the Riou Patent, while the coating of the subject application is applied at rates of about 11 g/m<sup>2</sup>.

14. I have also read U.S. Patent No. 6,403,162 to Tokunaga et al. This reference teaches the addition of boric acid to a composition containing polyvinyl alcohol to harden it and make the resulting coating water more resistant. As in Riou, the addition of boric acid in this manner forms chemical bonds between the boric acid and the polyvinyl alcohol.

15. Making a water resistant coating as taught in the Tokunaga reference is clearly different than the water permeable coating of the subject application. In the subject application, the open structure from the physical bonding of the boric acid and polyvinyl alcohol allows penetration of the coating by water and does not resist water flow.

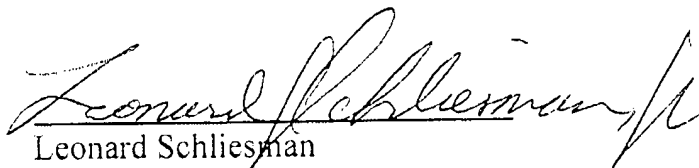
16. Cooking of the boric acid and polyvinyl alcohol and failure to initiate cross-linking or coagulation reactions produces a different product than is taught in the prior art.

17. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

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statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

  
Leonard Schliesman

10/04/2005  
Date